

Technical Report
Defense University Instrumentation Research Program

Grant Number F49620-00-1-0264

Test Equipment for a W-band Microwave Source

Sponsored by
Air Force Office of Scientific Research/NE

Program Manager
Dr Robert J. Barker
AFOSR/NE
801 North Randolph St., Rm. 732
Arlington, VA 22203-1977

20011003 112

Final Technical Report

The equipment purchased with the 2000 DURIP contract # F49620-00-1-0264 is listed below.

Equipment and Vendor	Cost
Millimeter Wave Vector Network Analyzer Agilent Technologies	\$130,882
Millimeter wave waveguide components Millitech Inc.	\$2,676
Positioning stages and optical components Newport Corporation	\$53,254

The above items total cost is \$186,812. The difference between this and the grant amount of \$200,000 has been returned to AFOSR.

The Agilent Millimeter Wave Vector Network Analyzer is being used to cold test the LIGA fabricated RF circuits and components used in the 94 GHz Klystrino program funded by the 1999 MURI on Innovative Vacuum Electronics. The vector network analyzer, together with some inhouse fabricated coaxial probes, is used to determine frequency, external Q and circuit losses in the LIGA cavities of the klystrino. The small physical dimensions of these cavities and coupling irises make the measurement process very difficult. Prior to the acquisition of the vector network analyzer, standalone electronic equipment was combined to provide similar measurement capabilities but its measurement accuracy was questionable and the data acquisition process required orders of magnitude more time for an equivalent measurement. The small feature size of the resonant cavities in the klystrino led to severe difficulties with a hand manipulated measurement setup. In order to accurately position and translate the measurement probes, several linear translation stages were used to provide computer control of the position and linear motion of the millimeter wave coaxial probes. The translation stages as well as some optical equipment to provide closeup viewing of the circuit and probes were purchased from Newport Corporation.

The final equipment purchase made in connection with the MURI funded klystrino program consisted of several pieces of millimeter wave waveguide components from Millitech Inc. These components are used to provide coupling to the RF circuit and to couple a portion of the signal to diagnostic equipment.

Appended to this document is a photograph of the DURIP funded equipment showing the vector network analyzer and the Newport positioning stages and optical workbench. Stanford University sincerely appreciates the funding provided by the DURIP program as it will significantly improve the testing and subsequent design modifications for the 94 GHz Klystrino program.



Figure 1 Photograph of Agilent Millimeter Wave Vector Network Analyzer and the Newport linear positioning stages and optical workbench.

Sincerely,

Glenn Scheitrum

Glenn Scheitrum

REPORT DOCUMENTATION PAGE

AFRL-SR-BL-TR-01-

0489

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Project, Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE		3. REPORT	
4. TITLE AND SUBTITLE (DURIP 00) Test Equipment for a W-Band Microwave Source				5. FUNDING NUMBERS 61103D 3484/US	
6. AUTHOR(S) Professor Siemann					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Stanford University 651 Serra Street Room 260 Stanford, CA 94305-4125				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFOSR/NE 801 North Randolph Street Rm 732 Arlington, VA 22203-1977				10. SPONSORING/MONITORING AGENCY REPORT NUMBER F49620-00-1-0264	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION AVAILABILITY STATEMENT APPROVAL FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED				12b. DISTRIBUTION CODE AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFOSR) NOTICE OF TRANSMITTAL DTIC. THIS TECHNICAL REPORT HAS BEEN REVIEWED AND IS APPROVED FOR PUBLIC RELEASE LAW AFR 100-12. DISTRIBUTION IS UNLIMITED.	
13. ABSTRACT (Maximum 200 words) The funds from this equipment grant were used to purchase the following: one (1) Agilent Technologies Millimeter Wave Vector Network Analyzer (\$130,882), assorted Millitech Inc. millimeter wave waveguide components (\$2,676), and assorted Newport Corp. positioning stages and optical components (\$53,254). The unexpended balance of \$13,188 is being returned to the government. All of the above equipment is being directly applied to accelerate research progress on the 94 GHz "klystrino" concept being studied under the FY99 Vacuum Electronics MURI.					
14. SUBJECT TERMS				15. NUMBER OF PAGES	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED		18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED		19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	
				20. LIMITATION OF ABSTRACT UL	